

## **Title: Circle Graphs Using Fractions And Percents**

### **Brief Overview:**

The students will use their understanding of equivalent fractions, percentages, benchmarks, data collection and analysis, and art in order to create a unique circle graph. This comprehensive development plan will help students make connections between fractions and percentages in order to guide their understanding of how to create, read and interpret circle graphs.

### **NCTM Content Standard/National Science Education Standard:**

Data Analysis and Probability  
Knowledge of Number Relationships or Computation

### **Grade/Level:**

Grades 4-5

### **Duration/Length:**

Three, 70-minute blocks; One 30 minute block for assessment at the end.

### **Student Outcomes:**

Students will:

- Apply knowledge of fractions and percents to read circle graphs.
- Apply knowledge of fractions and percents to interpret circle graphs.
- Use fractions and percents to create circle graphs to organize and interpret data.

### **Materials and Resources:**

#### Lesson One

- Resource Sheet 1- Student (2 class sets)
- Fraction circle pieces (1 set per 2 students)
- Resource Sheet 2- Student
- Chart paper
- Resource Sheet 3- Student

#### Lesson Two

- Resource Sheet 4- Student (2 class sets)
- Bags of manipulatives for each group (See Lesson 2 for set up)
- Chart paper
- ½ sheet of paper per group
- Transparency of Resource Sheet 5- Teacher
- Overhead markers (blue, green, red, yellow)

- “Benchmark It!” game directions (Resource Sheet 6- Student), 1 dot cube, 1 enlarged and laminated game board (Resource Sheet 7), 1 erasable marker in each color (red, yellow, blue, green) per group
- Resource Sheet 8- Student
- Bags of 100 manipulatives (4 distinct groups of 25) (Optional for reteach)

### Lesson Three

- Resource Sheet 9- Student (2 class sets)
- Resource Sheet 10- Student
- Paper plate, paper fastener, 8 inch piece of string, piece of masking tape (per student)
- 1 set of markers for each group
- Resource Sheet 11- Student

### Summative Assessment

- Resource Sheet 12- Student

## **Development/Procedures:**

### Lesson 1

#### Preassessment

1. Distribute Resource Sheet 1. Give students 10 minutes to complete.

#### Launch

1. Distribute fraction circle pieces to each pair of students. Give students time to manipulate the materials, reminding students to make notes about anything they notice as they “play” with the materials.
2. Share observations with their partner.
3. Facilitate a discussion about their observations.
  - Did you notice anything that was the same about these fraction pieces?
  - How about anything that was different?
  - Did you notice any two pieces that covered the same area?
  - What different combinations can you use to make a whole piece?

#### Teacher Facilitation

1. If needed, review the basic concepts of fractions. Remind students that fractions represent a part to whole relationship. Demonstrate, as needed with the circle fraction pieces. For example:  $\frac{2}{4}$  is the same as 2 out of the 4 pieces that make the whole.  $\frac{3}{4}$  is the same as 3 out of the 4 pieces that make the whole.

2. Introduce the term, **equivalent fractions**, which are fractions that represent equal parts of the whole. Add to your word wall and if you use journals/notebooks, add this vocabulary word there, too.
3. Explain equivalent by showing the whole circle on the overhead, and beside it, 2 halves. Note that 2 halves are equal to or equivalent to one whole.
4. Show other examples that are equivalent to one whole. ( $\frac{3}{3}$ ,  $\frac{4}{4}$ ,  $\frac{5}{5}$ ...)
5. Introduce the concept of **benchmark fractions**, which are fractions that are easily recognizable and can be used to compare other fractions. ( $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{3}{4}$ ,  $\frac{1}{3}$ )

#### Student Application

1. Start a class chart that lists examples of equivalent fractions. List only one or two examples.
2. Distribute Resource Sheet 2. Review directions and examples with students. Students can work in small groups using fraction circle pieces to list and draw equivalent fractions.

#### Embedded Assessment

1. Observation of student work during application.
2. Distribute a second copy of Resource Sheet 1.
3. Students complete this sheet.
4. Go over the correct answers with the students.
5. Re-distribute their original assessment and compare the Resource Sheets.
6. Ask students to write a few sentences to explain how their knowledge changed. They should use comparisons between the first and second time they completed the assessment.

#### Reteaching/Extension

1. For those students who need extra help, Resource Sheet 3 can be used to take them step by step through another example of equivalent fractions.
2. For students who understand the concept of equivalent fractions, give them the following journal problem. They may work with a partner. **Question:** Last night, my mom ordered two pizzas. The cheese pizza was cut into four pieces. The pepperoni was cut into eight pieces. Mom wants to make sure my brother and I get an equal amount of pizza. I like cheese and he likes pepperoni. How could Mom make sure we get the same amount? Use mathematical words and pictures to explain your answer.

## Lesson 2

### Preassessment

1. Distribute Resource Sheet 4. Allow students 10 minutes to complete the preassessment.

### Launch

\* Prior to this lesson, be sure to prepare manipulative bags. Combine 25 red, 25 blue, 25 yellow, and 25 green manipulatives to be used by the whole class. Mix them and prepare a sample bag for each group. Each group does NOT need to have an equal number of manipulatives in their bag.

1. Students will work in small groups.
2. Distribute a bag of manipulatives to each group.
3. Allow time for students to sort the manipulatives.
4. Discuss the different ways they can be sorted, if appropriate.
5. Ask students to sort their manipulatives by color.
6. Give students a half sheet of paper to list the colors and tally the number of each.
7. Create a class data collection sheet, and find the class total for each color. (There should be a total of 25 of each color.)

### Teacher Facilitation

1. Introduce the word **cent**, which means 100.
2. As a class, brainstorm a list of words that contain **cent**. (century, centimeter, centipede, cents, etc.)
3. Add **cent** to your word wall and if you use journals/notebooks, add this vocabulary word there, too.
4. Ask students what they think **percent** means. Discuss its actual meaning, which is **for each hundred**.
5. If they have trouble understanding per, you may choose to use the example: If I have three pencils per student, what does that mean? It means that **for each** student, I have three pencils.
6. Refer back to the class chart that represents the total number of each color of manipulative. Note that there are 100 total.
7. Explain that the class is going to create a circle graph to represent each color as a percent. Show several examples of circle graphs from magazines, newspapers, etc. pointing out the important parts of the graphs. (titles, labels, pie pieces, etc.)

8. Display a transparency of a circle (Resource Sheet 5-Teacher) divided into 100 equal parts. Ask students to choose one of the colors from the chart. Color in one part of the circle for each manipulative of that color. (All should be 25, so you will color 25 pieces.) Point out that this shows 25%.
9. Ask students if they have seen anything that looks like this before. Students should make the connection that this looks like the fraction  $\frac{1}{4}$ .
10. Explain that 25% of a whole is equal to  $\frac{1}{4}$  of that same whole, because  $\frac{25}{100}$  equals  $\frac{1}{4}$  (equivalent fractions).
11. Color the remaining parts of the graph to show that each color has 25%. Be sure to add a title and labels to reinforce their importance.
12. Using the overhead projector and the transparency, show examples of benchmark percents (25%, 50%, 75%, 100%) Ask questions to guide students in learning how to use benchmarks. For example: If you have 23%, which benchmark is that closest to? (25%) Which benchmark is 71% closest to? (75%)

#### Student Application

1. Play the game "Benchmark It!" (Resource 6 and 7-Student)
2. Distribute the directions for "Benchmark It!"
3. Students should read through the direction as a group, and then discuss them as a class. The teacher can answer/explain any unclear parts.
4. Give students time to play the game.

#### Embedded Assessment

1. Observation of student work during application.
2. Journal Question - Students can answer this question either in their journal or on any paper you would like them to use.  
Question: Why do you think it is important to recognize 25% on a circle graph?
3. Distribute a second copy of Resource Sheet 4.
4. Students complete this sheet.
5. Go over the correct answers with the students.
6. Re-distribute their original assessment and compare the Resource Sheets.
7. Ask students to write a few sentences to explain how their knowledge changed. They should use comparisons between the first and second time they completed the assessment.

#### Reteaching/Extension

1. For students who are having difficulty with the concept of percentage of 100, distribute bags of 100 objects (4 groups of 25 again) that can be sorted into separate categories by trait.
2. Give students time to separate the items however they would like.
3. Distribute Resource Sheet 8- Student. Work closely with any students having difficulty.
4. For students who understand the concept of percentage of 100, they can use Resource Sheet 8- Student as an independent activity.

### Lesson 3

#### Preassessment

1. Distribute Resource Sheet 9- Student. Allow students 10 minutes to complete the preassessment.

#### Launch

1. Distribute triangle grid paper. (Resource Sheet 10- Student)
2. Have students use white, blue, red, yellow, and green to color the 100 triangles on the grid paper.
3. On the back of the grid paper, have students tally the number of each color they used.

#### Teacher Facilitation

1. Review benchmark percents with the students. (25%, 50%, 75%, 100%)
2. Distribute one paper plate, an 8-inch length of yarn or string, a piece of masking tape, and one paper fastener per student.
3. Instruct the students to mark on their plate where each benchmark would be, starting at 12 o'clock.
4. Students find the center of the plate and poke a hole using their pencil.
5. Insert the paper fastener in the hole and secure.
6. Use a marker to draw a solid line from the center of the plate to 12 o'clock. This is where each percentage will begin (0%).
7. Tie one end of the string to the paper fastener in the center. Attach the masking tape to the other end of the string.

8. The teacher will demonstrate how to show different percentages using the moveable circle graph. For example: The teacher says 29% and demonstrates how to move the string to show where 29% would be if you start at 0%.
9. Then, the teacher gives random percentages for the students to represent on their moveable circle graphs. (17%, 49%, 78%, 99% etc...)

#### Student Application

1. Students should now refer back to their design they made on the triangle grid paper, and the tally sheet for that design.
2. Distribute Resource Sheet 11-Student and review the directions.
3. Point out again the importance of labels, title, etc.
4. Give students time to complete their own circle graph, and circulate to assist any students having difficulty.

#### Embedded Assessment

1. Observation of student work during application.
2. Collect and assess the completed circle graph.
3. Distribute a second copy of Resource Sheet 9- Student.
4. Students complete this sheet.
5. Go over the correct answers with the students.
6. Re-distribute their original assessment and compare the Resource Sheets.
7. Ask students to write a few sentences to explain how their knowledge changed. They should use comparisons between the first and second time they completed the assessment.

#### Reteaching/Extension

1. Students who are having difficulty can trade data with someone else in the class. They can then work with a student who understands how to create a circle graph, to practice/learn how to make one.
2. For students who quickly understand how to correctly create a circle graph, they can peer coach students who are having difficulty. This will reinforce the concept for them.

**Summative Assessment:**

The students will complete the assessment activity, Resource Sheet 12- Student. They will apply their knowledge of fractions, percents, and reading and interpreting circle graphs to complete Selected Response (SR), Brief Constructed Response (BCR), and Extended Constructed Response (ECR) questions.

**Authors:**

Rebecca Herald  
Guilford Elementary School  
Howard County

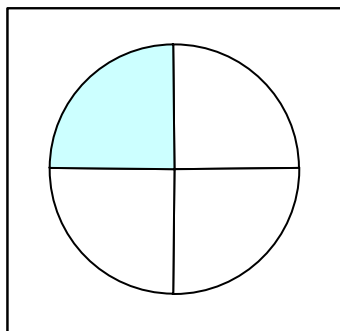
Tammy Seebohm  
Guilford Elementary School  
Howard County



Name \_\_\_\_\_ Date \_\_\_\_\_  
Preassessment One

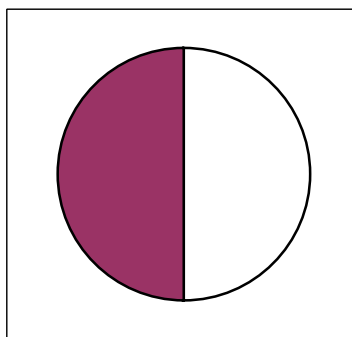
Directions: Write the fraction for the shaded part of each circle.

1.



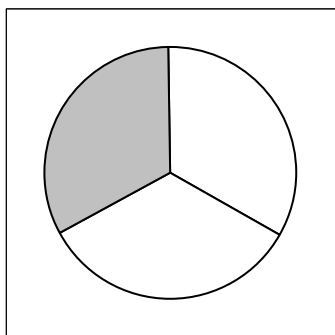
\_\_\_\_\_

2.



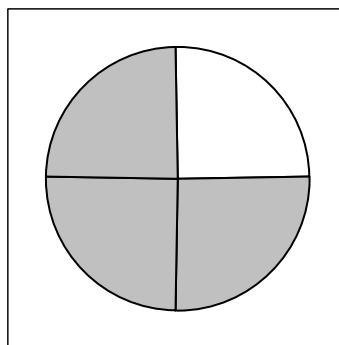
\_\_\_\_\_

3.



\_\_\_\_\_

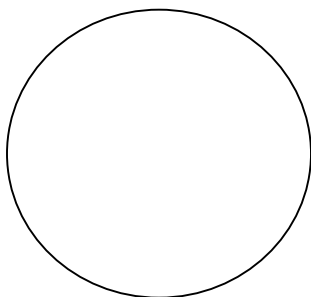
4.



\_\_\_\_\_

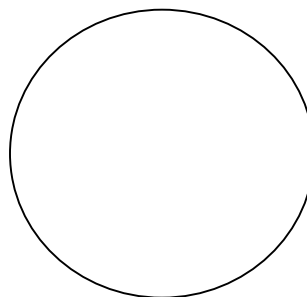
Directions: Draw lines and shade to show the given fraction.

5.



$\frac{1}{3}$

6.



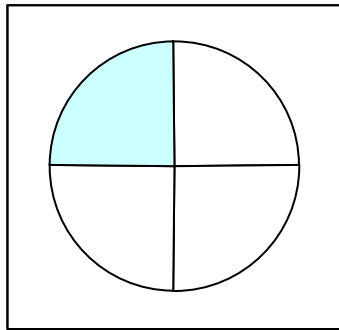
$\frac{1}{1}$

Name \_\_\_\_\_ Date \_\_\_\_\_

Preassessment One- Answer Key

Directions: Write the fraction for the shaded part of each circle.

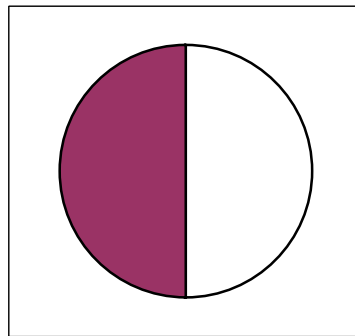
1.



$\frac{1}{4}$

\_\_\_\_\_

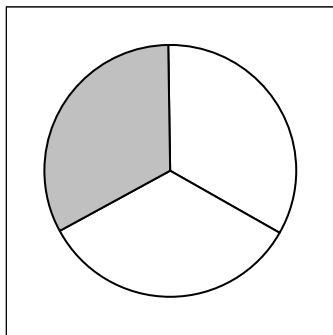
2.



$\frac{1}{2}$

\_\_\_\_\_

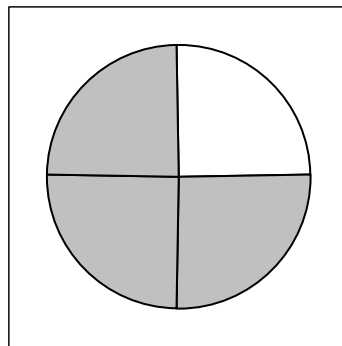
3.



$\frac{1}{3}$

\_\_\_\_\_

4.

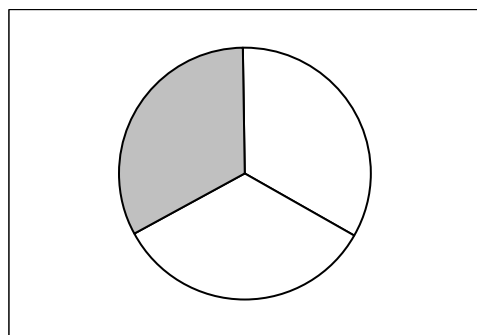


$\frac{3}{4}$

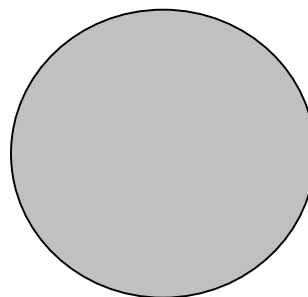
\_\_\_\_\_

Directions: Draw lines and shade to show the given fraction.

5.



6.



1/3

1/1

Name \_\_\_\_\_ Date \_\_\_\_\_

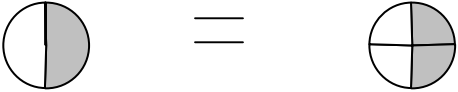
Directions: Use fraction circle pieces to find examples of equivalent fractions. Write the equivalent fractions and draw a diagram for each, as shown in the example.

1. equivalent fractions-

---



---

Equivalent Fractions	Diagram
<b>Example:</b> $1/2 = 2/4$	
1. $2/2 = \underline{\hspace{2cm}}$	1.
2. $3/4 = \underline{\hspace{2cm}}$	2.
3. $2/3 = \underline{\hspace{2cm}}$	3.
4. $1/4 = \underline{\hspace{2cm}}$	4.
5. $1/3 = \underline{\hspace{2cm}}$	5.

## Answer Key

## Resource Sheet 2- Teacher

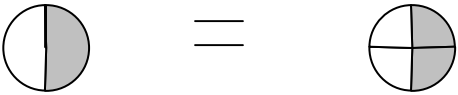
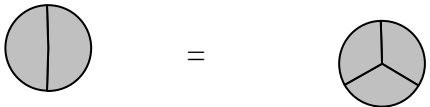
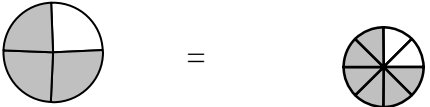
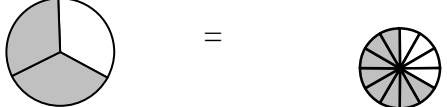
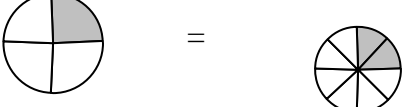
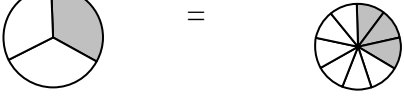
Answers will vary, however should demonstrate an understanding of what fractions are equivalent.  
Possible answers are shown.

Name \_\_\_\_\_ Date \_\_\_\_\_

Directions: Use fraction circle pieces to find examples of equivalent fractions. Write the equivalent fractions and draw a diagram for each, as shown in the example.

### 1. equivalent fractions-

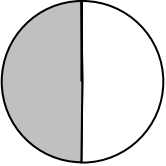
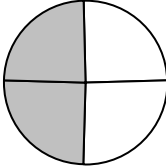
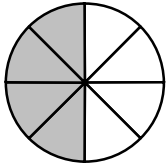
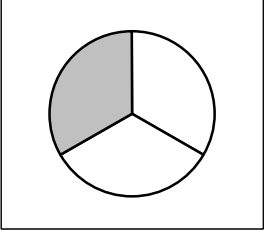
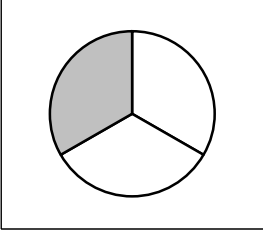
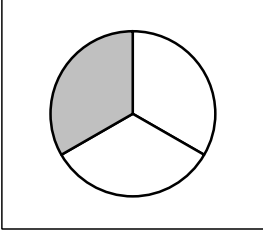
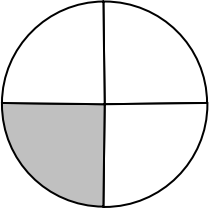
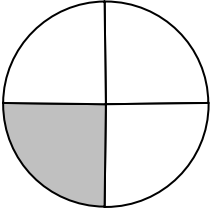
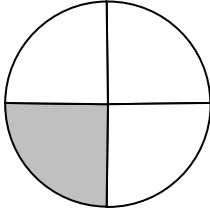
Fractions that represent equal parts of the whole

Equivalent Fractions	Diagram
<b>Example:</b> $1/2 = 2/4$	
1. $2/2 = \underline{3/3}$	
2. $3/4 = \underline{6/8}$	
3. $2/3 = \underline{8/12}$	
4. $1/4 = \underline{2/8}$	
5. $1/3 = \underline{3/9}$	

Resource Sheet 3- Student

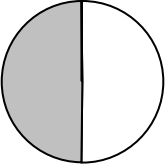
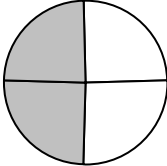
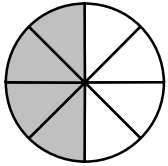
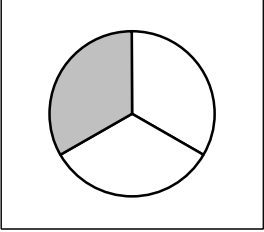
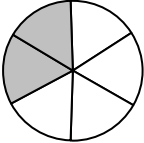
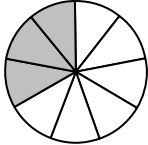
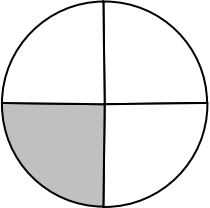
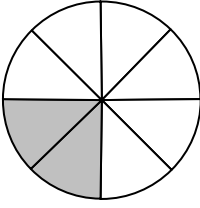
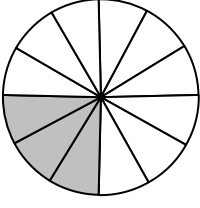
Name \_\_\_\_\_ Date \_\_\_\_\_

Directions: Add lines to the given circle. Be sure your lines divide the circle into equal parts.

Given Fraction	First Equivalent Fraction	Second Equivalent Fraction
<p>Example</p>  <p><math>\frac{1}{2}</math></p>	 <p><math>\frac{2}{4}</math></p>	 <p><math>\frac{4}{8}</math></p>
 <p>_____</p>	 <p>_____</p>	 <p>_____</p>
 <p>_____</p>	 <p>_____</p>	 <p>_____</p>

Name \_\_\_\_\_ Date \_\_\_\_\_

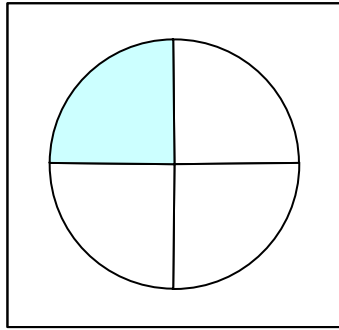
Directions: Add lines to the given circle. Be sure your lines divide the circle into equal parts. **Answers will vary. Possible answers are shown.**

Given Fraction	First Equivalent Fraction	Second Equivalent Fraction
<p>Example</p>  <p><math>\frac{1}{2}</math></p>	 <p><math>\frac{2}{4}</math></p>	 <p><math>\frac{4}{8}</math></p>
 <p><math>\frac{1}{3}</math></p> <p>_____</p>	 <p><math>\frac{2}{6}</math></p> <p>_____</p>	 <p><math>\frac{3}{9}</math></p> <p>_____</p>
 <p><math>\frac{1}{4}</math></p> <p>_____</p>	 <p><math>\frac{2}{8}</math></p> <p>_____</p>	 <p><math>\frac{3}{12}</math></p> <p>_____</p>

Name \_\_\_\_\_ Date \_\_\_\_\_  
Preassessment Two

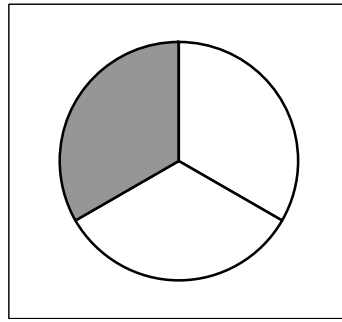
Directions: Write the percent for the shaded part of each circle.

1.



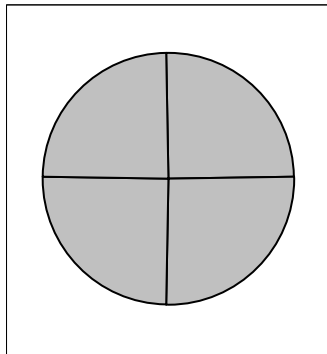
\_\_\_\_\_

2.



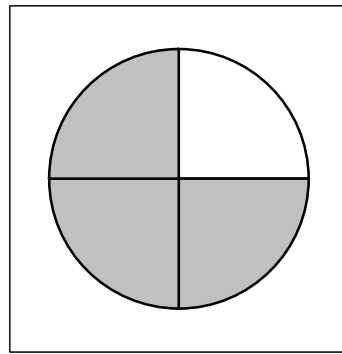
\_\_\_\_\_

3.



\_\_\_\_\_

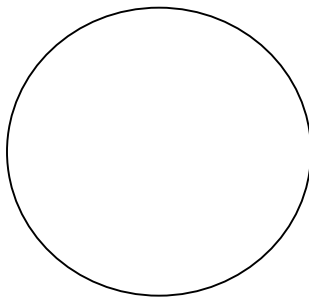
4.



\_\_\_\_\_

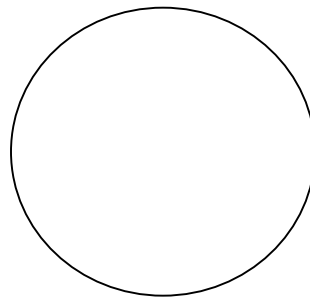
Directions: Draw lines and shade to show the given percentage.

5.



70%

6.



50%



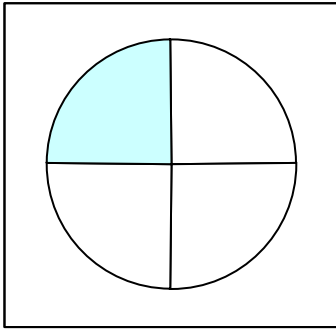
Answer Key

Name \_\_\_\_\_ Date \_\_\_\_\_

Preassessment Two

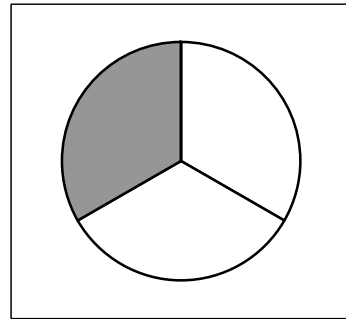
Directions: Write the percent for the shaded part of each circle.

1.



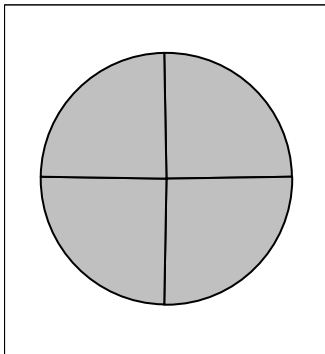
25%

2.



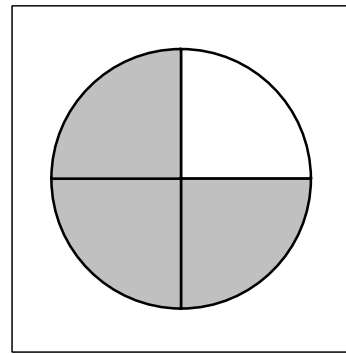
33%

3.



100%

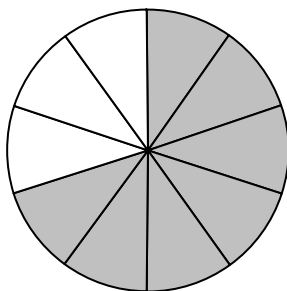
4.



75%

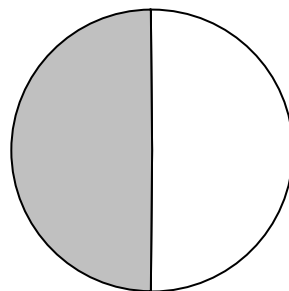
Directions: Draw lines and shade to show the given percentage.

5.

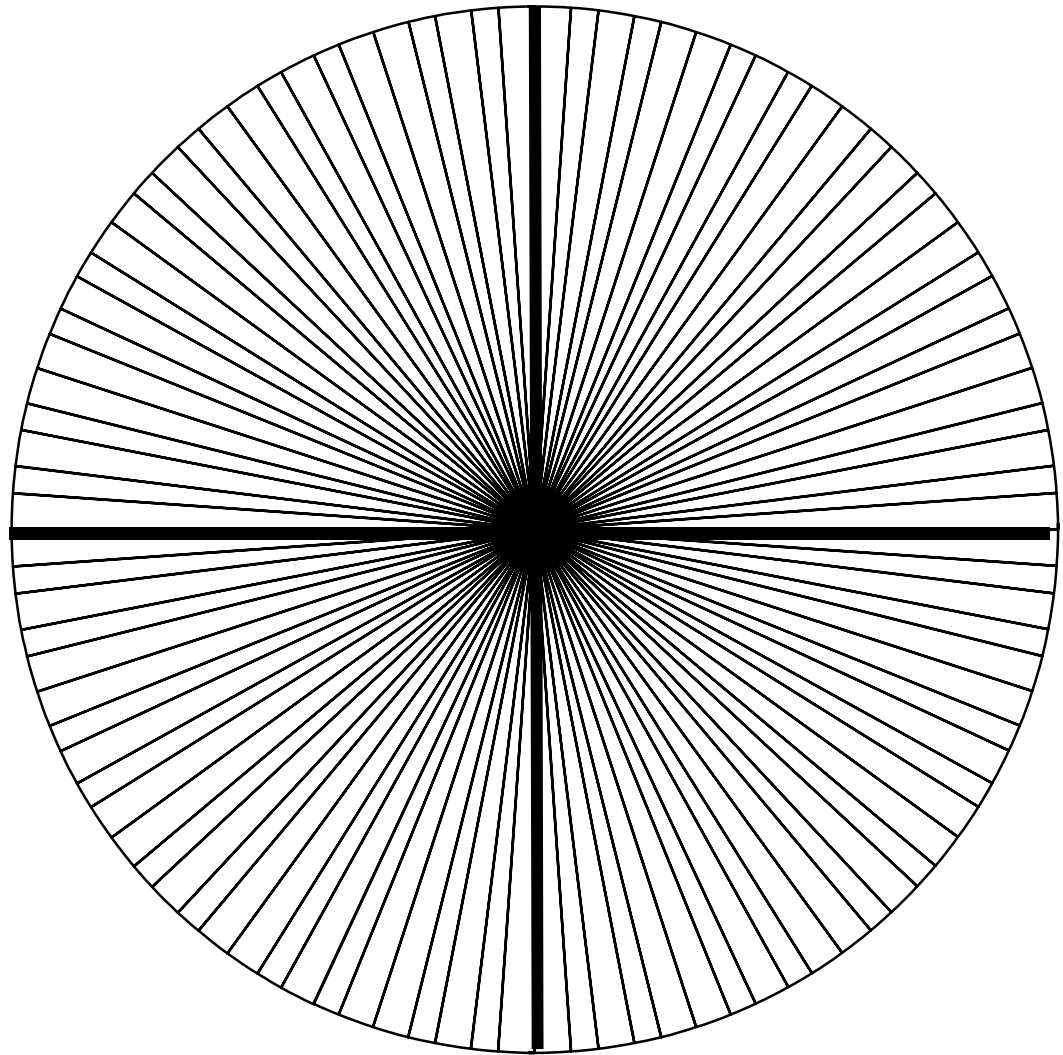


70%

6.



50%



# Benchmark it!



## Materials:

- 4 people
- 1 dot cube
- 1 game board per group (enlarged from original)
- red, blue, yellow, and green dry erase markers for each group

## Directions:

1. Each player chooses a color.
2. Each player will roll the dot cube to see who will go first.
3. The person with the lowest roll will go first.
4. For each turn, the player rolls the dot cube and colors in that number of sections on the game board in their color section. (For example, the red player rolls a 4, then colors in four red sections on the game board.)
5. Pass the dot cube to the person to the right.
6. Play continues in this manner until one player reaches 25%.

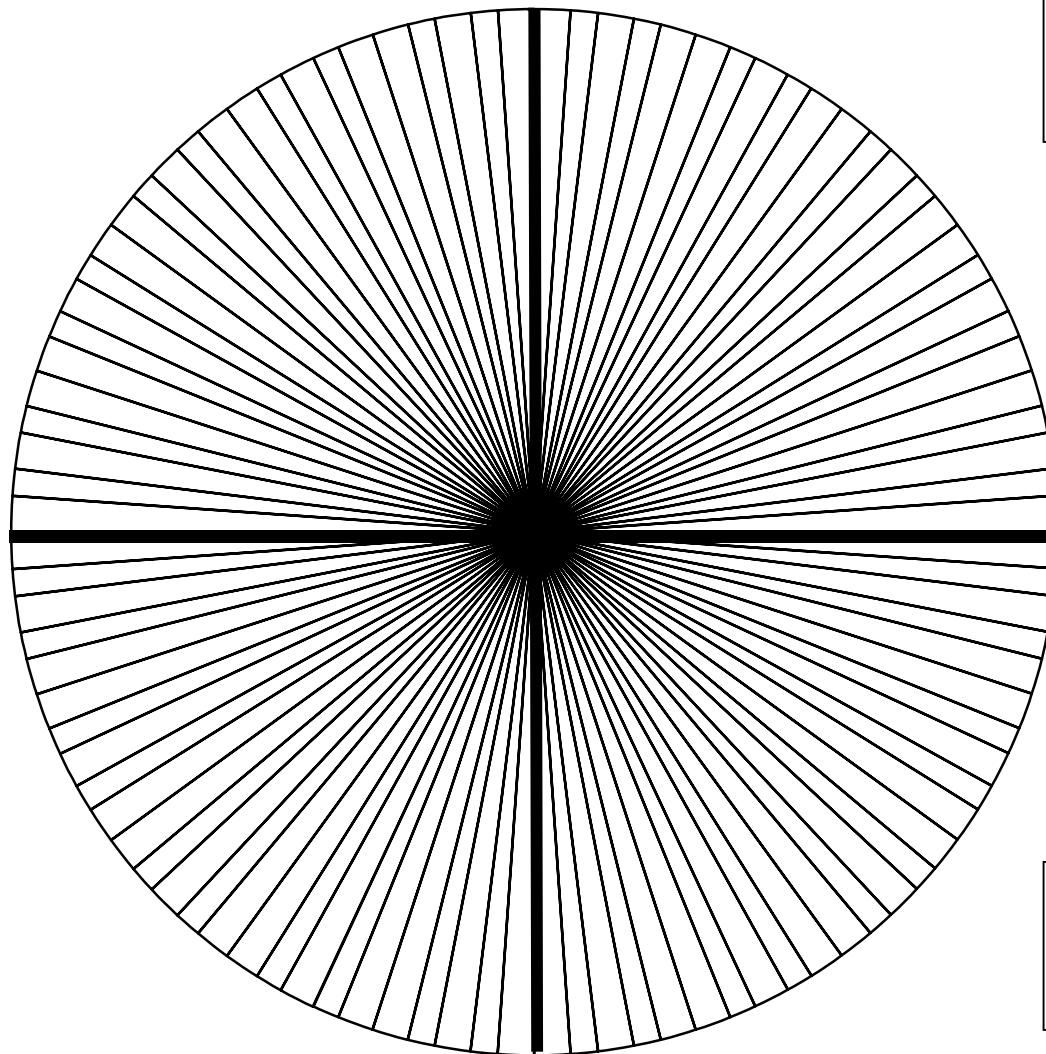
# Benchmark It!

Red

Yellow

Blue

Green



## Resource Sheet 8 – Student

Name \_\_\_\_\_ Date \_\_\_\_\_

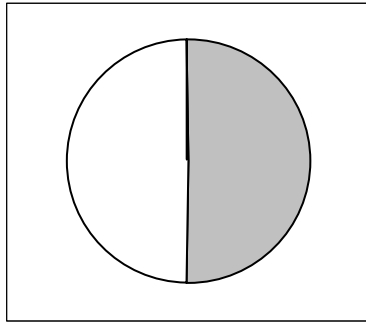
Directions: After sorting your objects into categories, use the following table to organize your data. List the trait for each category. Then count the number of objects for each category and record it. Complete the table with a fraction and percent for each.

Trait	Number of Items	Fraction of Items	Percent of Items
1.			
2.			
3.			
4.			
5.			

Name \_\_\_\_\_ Date \_\_\_\_\_  
Preassessment Three

Directions: Identify the shaded area as a fraction and a percent .

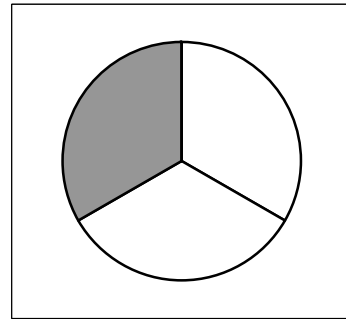
1.



Fraction \_\_\_\_\_

Percent \_\_\_\_\_

2.

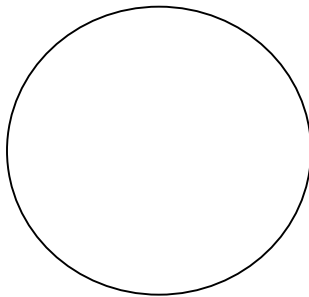


Fraction \_\_\_\_\_

Percent \_\_\_\_\_

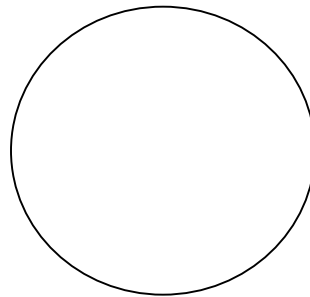
Directions: Draw lines and shade to show the given fractions or percentages.

3.



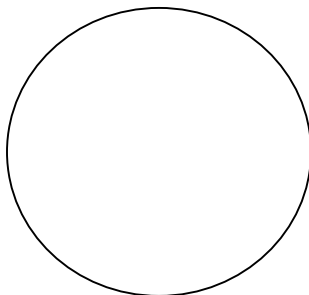
$\frac{2}{8}$

4.



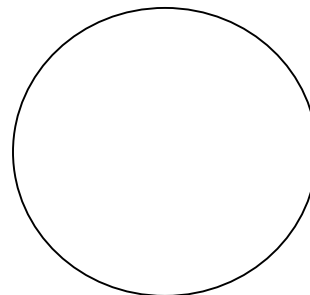
20%

5.



$\frac{2}{3}$

6.



89%

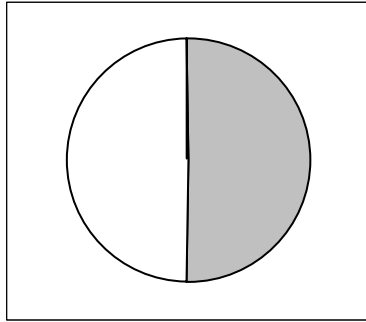
Answer Key

Name \_\_\_\_\_ Date \_\_\_\_\_

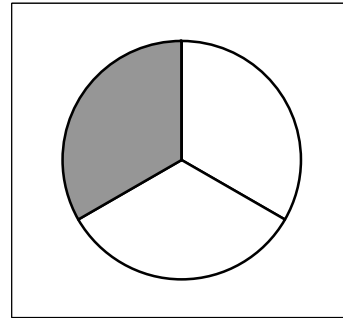
## Preassessment Three

Directions: Identify the shaded area as a fraction and a percent .

1.

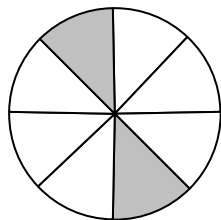
Fraction  $\frac{1}{2}$ Percent 50%

2.

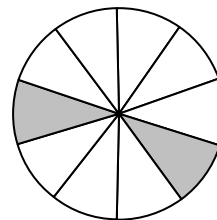
Fraction  $\frac{1}{3}$ Percent 33%

Directions: Draw lines and shade to show the given fractions or percentages.

3.

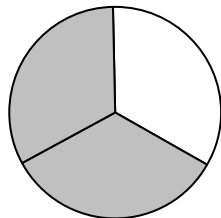
 $\frac{2}{8}$ 

4.

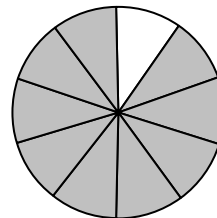


20%

5.

 $\frac{2}{3}$ 

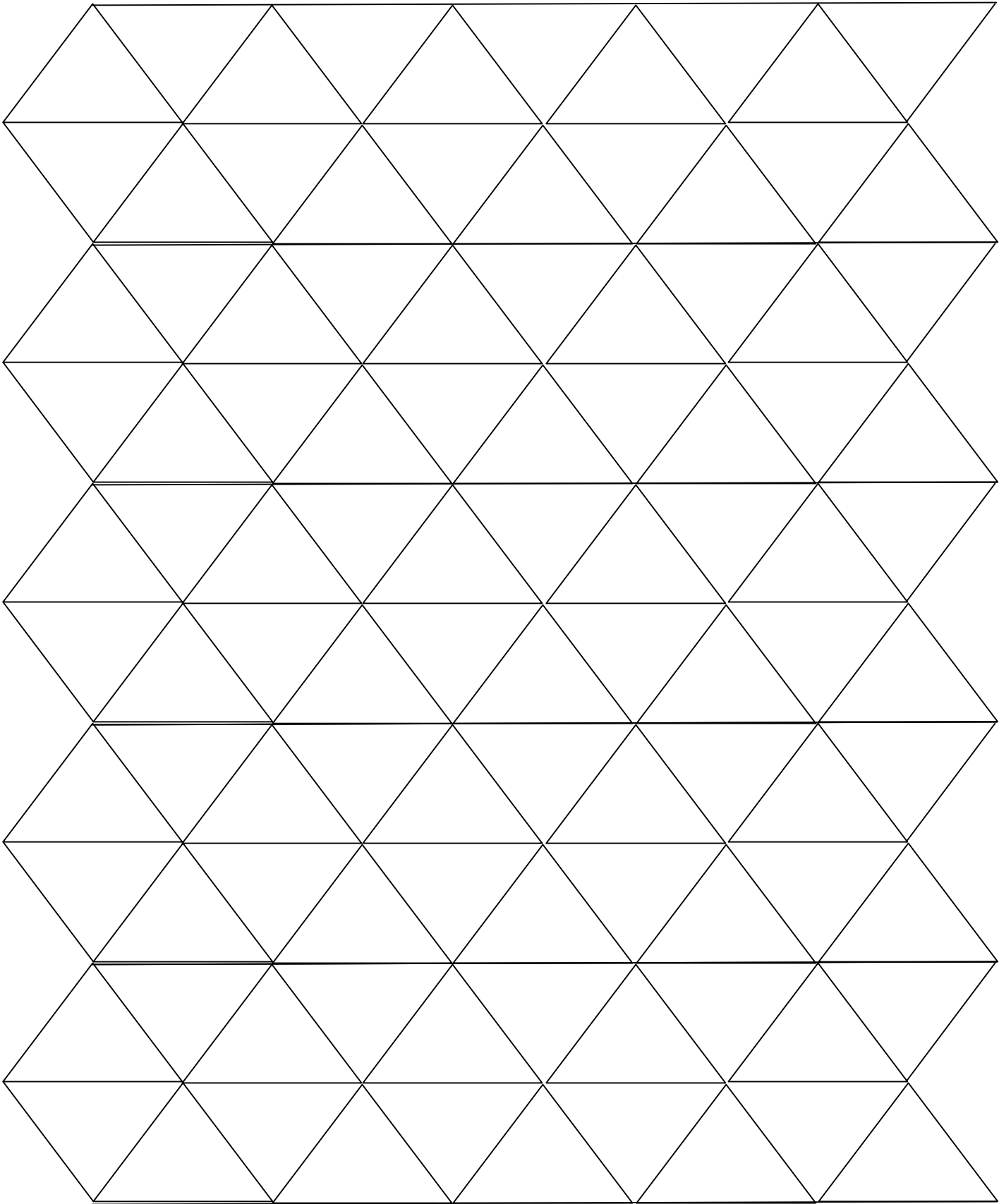
6.



89%

Name \_\_\_\_\_

Date \_\_\_\_\_



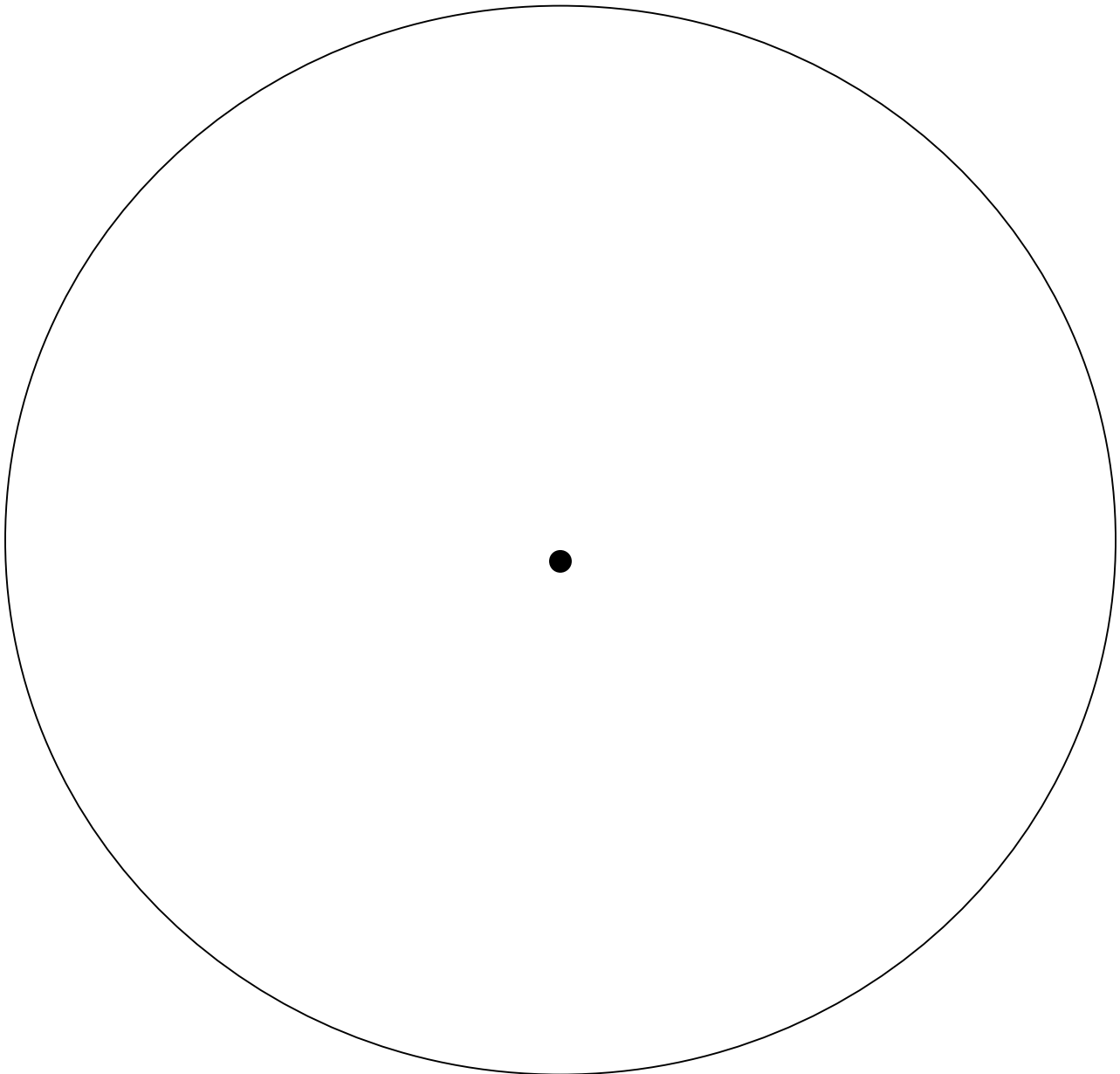


Resource Sheet 11 – Student

Name \_\_\_\_\_ Date \_\_\_\_\_

Directions: After completing Student Resource Sheet 10, write the number of each color you used in the appropriate space below. Then use that information and what you know about circle graphs to fill out the circle graph below. **Be sure to include all important parts of a graph.**

Blue = \_\_\_\_\_ White = \_\_\_\_\_ Green = \_\_\_\_\_  
Red = \_\_\_\_\_ Yellow = \_\_\_\_\_



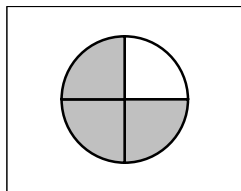
Name \_\_\_\_\_ Date \_\_\_\_\_

Part A – Select the best answer for the following questions. Mark your answer on the answer sheet. If you do not know an answer, you may skip that question, but be sure to come back to it at the end. If you skip a question, be careful to mark your next answer beside the correct number on the answer sheet. (1 point each)

1. Which is the largest?

- Ⓐ  $\frac{3}{4}$
- Ⓑ  $\frac{1}{2}$
- Ⓒ  $\frac{1}{4}$
- Ⓓ  $\frac{2}{4}$

2. Which fraction correctly names the shaded portion of this circle?



- Ⓐ  $\frac{3}{5}$
- Ⓑ  $\frac{3}{4}$
- Ⓒ  $\frac{4}{3}$
- Ⓓ  $\frac{1}{2}$

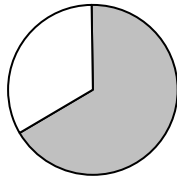
3. Joel has  $\frac{2}{3}$  of a pizza, Jeff has  $\frac{1}{2}$  of a pizza. Which of the following statements is true?

- Ⓐ Joel has more pizza.
- Ⓑ Jeff has more pizza.
- Ⓒ Joel has less pizza.
- Ⓓ Both Joel and Jeff have an equal amount of pizza.

4. 42% is closest to which benchmark percentage?

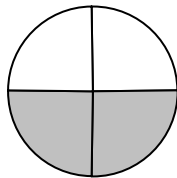
- Ⓐ 75%
- Ⓑ 50%
- Ⓒ 25%
- Ⓓ 100%

5. Which percentage most accurately describes the shaded area of this circle?



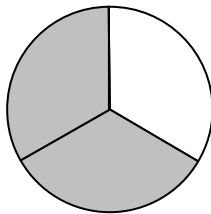
- Ⓐ 50%
- Ⓑ 33%
- Ⓒ 75%
- Ⓓ 66%

6. What percentage of the circle is shaded?



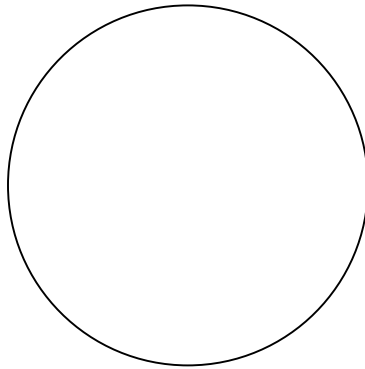
- Ⓐ 20%
- Ⓑ 25%
- Ⓒ 50%
- Ⓓ 75%

7. Tammy has 67% of her homework finished. Rebecca has  $\frac{1}{2}$  of her homework finished. Which of the following statements is true?
- Ⓐ Tammy has less of her homework finished.
  - Ⓑ Rebecca has less of her homework finished.
  - Ⓒ Rebecca has more of her homework finished.
  - Ⓓ Both Rebecca and Tammy have an equal amount of their homework finished.
8. Tim's team won  $\frac{1}{3}$  of their baseball games this season. Mike's team won 25% of their games this season. Which of the following statements is true?
- Ⓐ Tim's team won fewer of their games.
  - Ⓑ Both teams won an equal amount of their games.
  - Ⓒ Mike's team won more of their games this season.
  - Ⓓ Tim's team has won more of their games this season.
9. Look at the circle. Which fraction and percent correctly name the shaded part of the circle?



- Ⓐ  $\frac{2}{3}$  and 66%
  - Ⓑ  $\frac{2}{3}$  and 33%
  - Ⓒ  $\frac{1}{3}$  and 66%
  - Ⓓ  $\frac{3}{3}$  and 33%
10. Which of the following are equivalent?
- Ⓐ  $\frac{1}{4}$  and  $\frac{2}{4}$
  - Ⓑ  $\frac{1}{2}$  and  $\frac{2}{4}$
  - Ⓒ  $\frac{1}{2}$  and  $\frac{2}{8}$
  - Ⓓ  $\frac{3}{4}$  and  $\frac{1}{8}$

Part B –



11. Color **90%** of the circle above. (1 point)

12. Using what you know about percentage, tell why you chose to put your lines where you did. Use mathematical terms and/or pictures to explain your answer. (2 points)

---

---

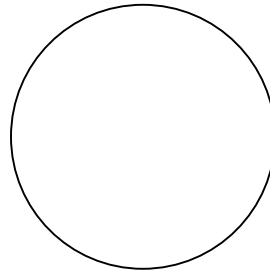
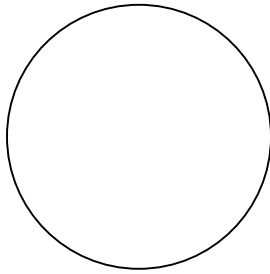
---

---

---

---

13. There are 100 fifth grade students going on a field trip. Miss Seeböhm said that  $\frac{3}{4}$  of the students packed a lunch. Miss Herald said that 75% of the students packed a lunch. Using what you know about fractions and percents, tell whose statement is more accurate, and why. Be sure to use mathematical vocabulary, numbers and pictures to explain your answer. (4 points)



---

---

---

---

---

---

---

---

---

---

## Answer Key

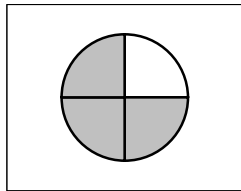
Name \_\_\_\_\_ Date \_\_\_\_\_

Part A – Select the best answer for the following questions. Mark your answer on the answer sheet. If you do not know an answer, you may skip that question, but be sure to come back to it at the end. If you skip a question, be careful to mark your next answer beside the correct number on the answer sheet. (1 point each)

1. Which is the largest?

- $\frac{3}{4}$
- Ⓐ  $\frac{1}{2}$
- Ⓑ  $\frac{1}{4}$
- Ⓓ  $\frac{2}{4}$

2. Which fraction correctly names this circle graph?



- Ⓐ  $\frac{3}{5}$
- $\frac{3}{4}$
- Ⓑ  $\frac{4}{3}$
- Ⓓ  $\frac{1}{2}$

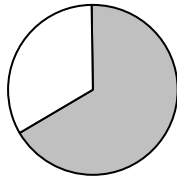
3. Joel has  $\frac{2}{3}$  of a pizza, Jeff has  $\frac{1}{2}$  of a pizza. Which of the following statements is true?

- Joel has more pizza.
- Ⓑ Jeff has more pizza.
- Ⓒ Joel has less pizza.
- Ⓓ Both Joel and Jeff have an equal amount of pizza.

4. 42% is closest to which benchmark percentage?

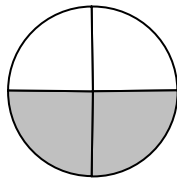
- Ⓐ 75%
- 50%
- Ⓒ 25%
- Ⓓ 100%

5. Which percentage most accurately describes the shaded area of this circle?



- Ⓐ 50%
- Ⓑ 33%
- Ⓒ 75%
- 66%

6. What percentage of the circle is shaded?



- Ⓐ 20%
- Ⓑ 25%
- 50%
- Ⓓ 75%



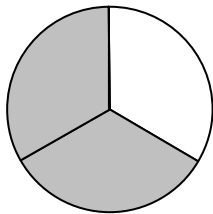
7. Tammy has 67% of her homework finished. Rebecca has  $\frac{1}{2}$  of her homework finished. Which of the following statements is true?

- Ⓐ Tammy has less of her homework finished.
- Rebecca has less of her homework finished.
- Ⓒ Rebecca has more of her homework finished.
- Ⓓ Both Rebecca and Tammy have an equal amount of their homework finished.

8. Tim's team won  $\frac{1}{3}$  of their baseball games this season. Mike's team won 25% of their games this season. Which of the following statements is true?

- Ⓐ Tim's team won fewer of their games.
- Ⓑ Both teams won an equal amount of their games.
- Ⓒ Mike's team won more of their games this season.
- Tim's team has won more of their games this season.

9. Look at the circle. Which fraction and percent correctly name the shaded part of the circle?

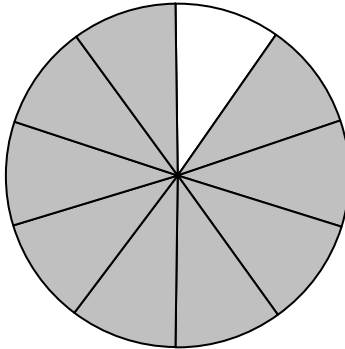


- $\frac{2}{3}$  and 66%
- Ⓑ  $\frac{2}{3}$  and 33%
- Ⓒ  $\frac{1}{3}$  and 66%
- Ⓓ  $\frac{3}{3}$  and 33%

10. Which of the following are equivalent?

- Ⓐ  $\frac{1}{4}$  and  $\frac{2}{4}$
- $\frac{1}{2}$  and  $\frac{2}{4}$
- Ⓒ  $\frac{1}{2}$  and  $\frac{2}{8}$
- Ⓓ  $\frac{3}{4}$  and  $\frac{1}{8}$

Part B –

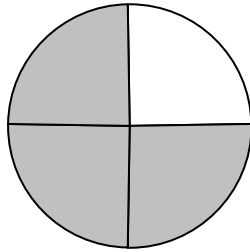


11. Color 90% of the circle above. (1 point)

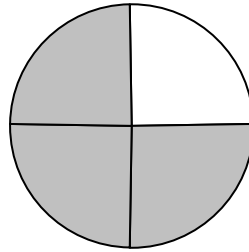
12. Using what you know about percentage, tell why you chose to put your lines where you did. Use mathematical terms and/or pictures to explain your answer. (2 points)

**90% of a circle is between 75% and 100%. I subtracted  $90 - 75 =$  to see how close 90% is to 75%. I found the difference was 15%. Then, I subtracted  $100 - 90 =$  to see how close 90% is to 100%. I found the difference was 10%. Because 10% is less than 15%, I knew that my line would have to be closer to 100%. I drew my line close to 100%, but left space to show the other 10%.**

13. There are 100 fifth grade students going on a field trip. Miss Seebohm said that  $\frac{3}{4}$  of the students packed a lunch. Miss Herald said that 75% of the students packed a lunch. Using what you know about fractions and percents, tell whose statement is more accurate, and why. Be sure to use mathematical vocabulary, numbers and pictures to explain your answer. (4 points)



$\frac{3}{4}$



75%

In the first circle, I colored in three out of four spaces to show the fraction  $\frac{3}{4}$ . That shows the amount of students in Miss Seebohm's class who packed a lunch. I know that 50% is equal to one half and that 100% would mean the whole circle would be colored in. Since 75% is half way between one half and one whole, I knew where to draw the lines and color in the circle to show the percent of students in Miss Herald's class who packed a lunch. Then I compared the two answers, and I realized that  $\frac{3}{4}$  and 75% are the same. Therefore, both teachers are correct.